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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/568,123	02/14/2006	Masayuki Takada	MAT-8814US	9609

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EXAMINER	
RO, BENTSU	
ART UNIT	**PAPER NUMBER**
2837	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/19/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/568,123	TAKADA, MASAYUKI	
	Examiner	Art Unit	
	Bentsu Ro	2837	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,5-7,13 and 17* is/are rejected.

7)☒ Claim(s) *3,4,8-12 and 14-16* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *2/14/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

FIRST OFFICE ACTION

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, (5,6,7,13,17)/1 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Oomura et al US Patent No. 5,694,010.

Examiner's note: the expression (5,6,7,13,17)/1 reads as claims (5,6,7,13,17) depend on claim 1.

Claims read onto Oomura et al teaching as follows:

The claims:	Oomura et al teaching:
1. A brushless dc motor coupled directly to an ac source,	Fig. 1 shows a brushless dc motor 8M coupled directly to an ac source 13; the word "directly" implies that the whole system coupled directly, not the motor per se coupled directly; see applicant's Fig. 2 for example; the motor 8M is a brushless dc motor, see column 2, line 54, for example;
the motor comprising: (a) a stator including a stator coil; (b) a rotor including a rotor magnet;	the brushless motor 8M includes three stator windings R, S, T, see Fig. 9(c); column 4, lines 62-63 states that

	"Each DC motor 2M, 7M and 8M, is a synchronous motor having a permanent magnet rotor.";
(c) a magnetic flux sensor for sensing a distribution of magnetic flux density of the rotor magnet;	each non-energized stator winding R, S, T, along with the comparators 79-81 (see Fig. 9(b)) functioned as a magnetic flux sensor; why?? the non-energized stator winding senses the back emf; the back emf is a function of rotor magnetic flux density according to the well-known equation: emf = (v x B) . l, wherein v = velocity of winding crosses the flux; x = a vector product B = magnetic flux density . = a scalar product l = length of winding that crosses the rotor magnetic flux; alternatively, Oomura column 1, lines 20-23 states that *"Some brushless motors have one or more sensors, for example hall effect devices, to detect the position of a permanent magnet rotor of the DC motor without touching the rotor."* thus, hall effect devices can replace the back emf sensing;
(d) an inverter circuit including a plurality of switching elements coupled in a full wave bridge having an upper arm and a lower arm;	Fig. 9(b) shows an inverter 11, the inverter 11 has switching transistors Tr11-Tr16 connected in a format of full-wave bridge; the upper transistors Tr11-Tr13 constitute an upper arm and the lower transistors Tr14-Tr16 constitute a lower arm; it is noted that the inverter 11 is identical to applicant's inverter 6 shown in applicant's Fig. 2;

(e) an AC source coupler;	the connecting wires that connect a rectifier 16 to the ac power source 13 are "AC source coupler", see Fig. 9(a);
(f) a rectifier for full wave rectifying a voltage of the ac source;	Fig. 9(a) shows a rectifier 16, the rectifier 16 can be a full-wave rectifier or a half-wave rectifier;
(g) a dc voltage converter for converting a rectified voltage supplied from the rectifier	Fig. 9(a) shows a dc/dc converter 18;
into a flat and low dc voltage,	the converter 18 is a voltage drop type, the voltage is in the range of 20-50 volts, see column 16, line 1; the converter 18 includes a rectifier circuit 183 for producing a flat and low dc voltage because the rectifier circuit 183 includes a smoothing filter capacitor; further, there is a smoothing circuit 192 inside the converter 19 (Fig. 9(a)) for still further smoothing the dc output voltage; Fig. 9(a) further shows a voltage-drop type dc/dc converter 19; thus, the converter 18 alone or the converters 18 and 19 together with the smoothing circuit 192 constitute a dc voltage converter;
and for applying the flat and low dc voltage to the inverter circuit as a power supply; and	the converters 18, 19 (Fig. 9(a)) supply the low and flat dc voltage to the inverter 11 (Fig. 9(b));
(h) a controller for controlling the inverter circuit based on	the remaining circuits of Figs. 9(a)-9(c);
a signal supplied from the magnetic flux sensor	the comparators 79-81 supply signals to a position determination circuit 82 (Fig.9(b)), the circuit 82 provides further signal to a conduction phase determination circuit 84 (Fig. 9(a)), the circuit 84 provides signal to

such that the low dc voltage is supplied to the stator coil in a full wave driving method.	an inverter drive circuit 78, the circuit 78 controls the inverter 11; the turning ON of transistors in the inverter 11 makes a path for the flow of the low and flat dc voltage from converter 19 to the motor windings R, S, T; the inverter 11 is a full-wave inverter, therefore, the conduction is a full wave drive, namely, the current can flow in either direction in the stator windings; see column 16, lines 36-37, the phrase *"the output of indoor fan inverter 11 is full-wave conduction."*
5. The brushless dc motor of claim 1, wherein the motor magnet is a pole-anisotropic magnet.	The examiner believes that the magnet is made from an anisotropic magnetic material. (Examiner's note: The material as well as the manufacturing of magnet is not applicant's invention.)
6. The brushless dc motor of claim 1, further comprising a current controller	Fig. 9(a) shows a switching transistor 191 and a switching pulse generator 193, these circuits together constitute a current controller because: (1) the transistor 191 controls the output voltage to the inverter; (2) the current is a function of voltage, namely, a higher voltage provides a higher current based on the Ohm's Law;
for regulating an average current of the inverter circuit constantly	Fig. 9(a) shows a smoothing circuit 192, the smoothing circuit 192 provides "smoothed" current to the inverter; the smoothed current, of course, is an average current;
at a set current.	Fig. 9(b) shows a speed instruction (c), the instruction is input to a rotation speed comparison circuit 87 (Fig. 9(a)), the

	comparison circuit 87 controls the activation control circuit 88, which circuit 88 controls a voltage determination circuit 77; the output signal of the voltage determination circuit 77 is a *"set current"* because, when voltage is set, the current is also set, based on the Ohm's law.
7. The brushless dc motor of claim 1 further comprising:	
a current instruction means	Fig. 9(a) shows a conduction phase determination circuit 84; it is noted that the phase conduction is related to winding current because the " phase conduction" requires the turning ON of the inverter transistors;
for instructing an average current of the inverter circuit;	unless specified, the current value and voltage value are always the average value or the effective value because the instant value is meaningless;
a current controller	Fig. 9(b) shows an inverter drive circuit 78;
for regulating the average current of the inverter circuit at a value instructed; and	the conduction phase determination circuit 84 provides signal to the inverter drive circuit 78, the inverter drive circuit 78 controls the ON/OFF of the inverter transistors;
an output means for outputting a signal of a motor rpm based on a signal supplied from the magnetic flux sensor,	Fig. 9(b) shows a rotation speed detection circuit 85, the rotation speed is detected based on the back emf from the comparators 79-81 and from the position determination circuit 82;
wherein the current instructing means instructs the inverter circuit to change the average current in response to the motor rpm.	as shown in Figs. 9(a) and 9(b), the speed signal is derived from the position determination circuit 82 (or position signal); the conduction phase determination circuit

	84 receives position signal from circuit 82 (not receiving the speed signal directly from circuit 85), however, because the position signal and speed signal are related as v=ds/dt, (s=position), thus, the circuit 84 responsive to a position signal is basically same as the circuit responsive to a speed signal.
13. The brushless dc motor of claim 1 further comprising a voltage reducing means disposed outside the motor via a terminal, wherein the low dc voltage supplied from the dc voltage converter is applied as a power supply to the inverter circuit via the voltage reducing means disposed outside the motor.	the converters 18, 19; see the circuit connection between the converter 19 and inverter 11 shown in Figs. 9(a) and 9(b).
17. An electric apparatus in which the brushless dc motor as defined in claim 1 is mounted.	Fig. 1 shows an indoor fan 8.

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 2, (5,6,7,13,17)/2 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oomura et al.

Claim 2 is same as that of claim 1 except claim 2 further set forth the limitation of a pulse width modulation in the inverter circuit.

Oomura Fig. 9 circuit does not include a pulse width modulation (PWM) control in the inverter circuit 11, see column 16, line 33. However, a PWM control is used in the compressor motor 2M by the inverter circuit 10, see Fig. 1 and column 6, lines 58-61. Thus, a PWM control obviously could be incorporated into the inverter 11 of the fan motor 8M, if needed.

The other subject matters of the claims 2, (5,6,7,13,17)/2 are same as that of the claims 1, (5,6,7,13,17)/1, explained previously in preceding paragraph 2, further discussion is not necessary.

5. Claims 3,4,8,9,10,11,12,14,15,16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

7. Any inquiry concerning this communication should be directed to Bentsu Ro at telephone number 571 272-2072.

1/11/2007

Bentsu Ro
Senior Examiner
Art Unit 2837